

## **ABSTRACT**

With the support of the Iowa Fly Ash Affiliates, research on reclaimed fly ash for use as a construction material has been ongoing since 1991. The material exhibits engineering properties similar to those of soft limestone or sandstone and a lightweight aggregate. It is unique in that it is rich in calcium, silica, and aluminum and exhibits pozzolanic properties (i.e. gains strength over time) when used untreated or when a calcium activator is added.

Reclaimed Class C fly ashes have been successfully used as a base material on a variety of construction projects in southern and western Iowa. A pavement design guide has been developed with the support of the Iowa Fly Ash Affiliates. Soils in Iowa generally rate fair to poor as subgrade soils for paving projects. This is especially true in the southern quarter of the state and for many areas of eastern and western Iowa. Many of the soil types encountered for highway projects are unsuitable soils under the current Iowa DOT specifications. The bulk of the remaining soils are Class 10 soils. Select soils for use directly under the pavement are often difficult to find on a project, and in many instances are economically unavailable.

This was the case for a 4.43-mile grading and paving project in Wapello County. The project begins at the Alliant Utilities generating station in Chillicothe, Iowa, and runs west to the Monroe-Wapello county line. This road carries a significant amount of truck traffic hauling coal from the generating station to the Cargill corn processing plant in Eddyville, Iowa. The proposed 10-inch Portland Cement Concrete (PCC) pavement was for construction directly on a Class 10 soil subgrade, which is not a desirable condition if other alternatives are available.

Wapello County Engineer Wendell Folkerts supported the use of reclaimed fly ash for a portion of the project. Construction of about three miles of the project was accomplished using 10 inches of reclaimed fly ash as a select fill beneath the PCC slab. The remaining mile was constructed according to the original design to be used as a control section for performance monitoring. The project was graded during the summers of 1998 and 1999.

Paving was completed in the fall of 1999. This report presents the results of design considerations and laboratory and field testing results during construction. Recommendations for use of reclaimed fly ash as a select fill are also presented.